Seattle Public Utilities Integrated Plan Expert Panel
Meeting #2, April 29, 2013
Meeting Summary

Participants

The second meeting of Seattle Public Utilities (SPU) Integrated Plan Expert Panel was attended by the five Expert Panel members, SPU managers and staff, consultants, and observers. The audience consisted largely of SPU staff and technical consultants. A full list of attendees is at the end of the summary.

Name	Organization
Expert Panel Members	
Bob Gearheart, Chair	Professor Emeritus, Humboldt State University, Arcata, CA
Derek Booth	Adjunct Professor, Bren School of Environmental Science and Management, University of California Santa Barbara, Santa Barbara, CA
Kyle Dreyfus-Wells	Manager of Watershed Programs, Northeast Ohio Regional Sewer District, Cleveland, OH
Bob Pitt	Cudworth Professor of Urban Water Systems, Department of Civil, Construction, and Environmental Engineering, University of Alabama, Tuscaloosa, AL
Jean Zodrow	Project Toxicologist, ARCADIS U.S., Inc., Lakewood, CO
SPU and Consultant Participants at the Table	
Kevin Buckley	Integrated Plan Project Manager, SPU
Ray Hoffman	Director, SPU
Trish Rhay	Drainage and Wastewater Division Director, SPU
Mike Milne	Integrated Plan Consultant Team Project Manager, Brown and Caldwell
Bill Ross	Expert Panel Facilitator, Ross Strategic

Meeting Objectives

The objectives for the Expert Panel meeting included:

- Review and gather Expert Panel feedback on SPU's proposed methodology for evaluating the potential water quality impacts of stormwater and combined sewer overflow (CSO) projects, including whether it seems appropriate given the consent decree requirements and available data.
- Collect Expert Panel feedback on proposed approaches to using data in the methodology, including proposed metrics and representative constituents of concern for evaluation.
- Identify additional available data or data sources that could help SPU and the technical team to refine and improve the proposed methodology and analysis of stormwater and CSO projects.
- Review upcoming meeting plans and identify next steps.

A summary of the meeting discussions, organized by the agenda topic, is below. Key themes from the meeting are not attributed to individuals, but comments pertaining to individual sessions are attributed.

Summary

Opening Remarks

- SPU Director Ray Hoffman welcomed the Expert Panel and thanked members for their participation. He described the challenges Seattle is facing, including stormwater runoff, CSOs, climate change, urban streams, and a landscape that is 65 percent impermeable surfaces.
- He noted that SPU had just signed its consent decree, and has an opportunity to do an Integrated Plan, which could potentially be a model for other jurisdictions. He said the Expert Panel would be important in helping SPU with the Integrated Plan.

Key Themes from the Expert Panel's Comments

Throughout the meeting, Expert Panel members commented on SPU's proposed methodology for evaluating stormwater and CSO projects, including the use of available data and the multi-objective decision analysis (MODA) process. The following were key themes from these comments and notes about SPU's responses (individual comments and responses are also included later in the summary):

- SPU should provide information on the process and criteria it used to identify projects for consideration for the Integrated Plan, including any "fatal flaw" screening criteria and the locations of projects, as this is an important part of the project evaluation.
    - SPU Response: The Integrated Plan team is preparing a memorandum on the selection criteria that were used to help the team identify projects for consideration as part of the Integrated Plan. In general, the criteria were developed to help the team identify a list of potential projects that would meet the objectives established by the Integrated Plan, focus on receiving water bodies with water quality impairments, fit into the existing built-out environment, and provide reasonable assurance that the list of potential projects can be constructed by 2025.
- It is not clear how SPU plans to consider and evaluate benefits from projects other than pollutant load reductions and other criteria listed in the consent decree. Expert Panel members recommended that co-benefits from projects, including habitat improvements, be considered. Furthermore, some Expert Panel members expressed concern that the proposed methodology for the CSO and stormwater project evaluations could become a matter of "dueling spreadsheets" and might ignore other important factors that do not lend themselves well to quantitative comparisons.
    - SPU Response: Benefits in addition those identified in the Consent Decree will be considered as part of the MODA that SPU will use to help inform the decision process for selection of stormwater projects to propose and the identification of CSO projects to defer in the Integrated Plan. SPU will be discussing these benefits and the technical criteria for the MODA evaluation of stormwater and CSO projects with the panel members at the June 25th meeting.
- Verification monitoring, including pre-project monitoring and monitoring of receiving water quality, is important to show whether projects achieve their goals and to reduce uncertainties.
    - SPU Response: SPU will consider this input as it plans the monitoring that will be proposed as part of the Integrated Plan. Monitoring for the Integrated Plan will include a post-project monitoring plan.

- It is important that the proposed metrics match the projects (both CSO and stormwater) that are being considered, and that the proposed analytic methods match the data being evaluated (e.g., the nomographs relate to the devices).
  - SPU Response: SPU agrees that the proposed metrics for evaluating CSO and stormwater projects should be appropriate for both types of projects. The purpose of the nomograph approach is to bracket the (hydrologic and hydraulic) performance of best management practices (BMPs). The nomographs are one way to represent the uncertainty in performance expected in modeling. The performance range for the nomographs will be geared to the BMPs being considered.
  - Care must be given to how these performance ranges are used in generating output that will then be compared with the metrics. The list of proposed metrics will be refined in the coming weeks as the technical team better understands the data going into the model and the stormwater projects being considered versus the CSO projects. For example, a stormwater project is usually designed to capture higher frequency, low-intensity storm events while a CSO project is designed to capture low frequency, but higher intensity storm events, so simply comparing reduced frequency of occurrence between the two types of projects is not a fair comparison. Other metrics may be considered, such as volume reduction or phosphorus reduction, as more appropriate comparisons between projects. SPU and the technical team will update the Expert Panel as this list of metrics is refined.

Overview of Approach to CSO and Stormwater Project Evaluation

- Mike Milne of Brown and Caldwell and Kevin Buckley of SPU gave a presentation that provided an overview of SPU's approach to the evaluation of CSO and stormwater projects in the Integrated Plan. This included:
  - The consent decree requirements for analyzing pollutant load reductions and describing reductions in exposure
  - The process SPU used to prioritize receiving water bodies for the purpose of selecting locations for stormwater projects
  - The overall evaluation process, from the ranking of water bodies and selection of candidate stormwater and CSO projects to the analysis of those projects and alternative combinations using the multi-objective decision analysis (MODA) process
  - An overview of the work completed to date to compile data and develop evaluation methods
- SPU manages a stormwater system that has 6,400 million gallons of stormwater runoff annually, and a combined sewer system that discharged 154 million gallons of CSOs in 2012.

Expert Panel Comments and Responses

Scope/Criteria for the Project Evaluation:

- Derek Booth and Bob Pitt asked whether the project evaluation was only focused on pollutant loads. Derek Booth expressed concern that the analysis would only cover chemical loads rather than other benefits such as habitat improvements from stormwater projects. Kyle Dreyfuss-Wells added that many of those other benefits are not part of the consent decree.

- Mike Milne and Rob Annear of the technical team responded that pollutant loads are important, but SPU would also look at exposure, frequency, duration, flow, volume, and other issues.

- Kyle Dreyfuss-Wells noted that co-benefits from stormwater projects need to be considered as part of the analysis.
- Bob Gearheart asked about the relationship of the pollutant load evaluation and Total Maximum Daily Loads (TMDLs).
  - Technical team members noted that the pollutant load evaluation of projects for the Integrated Plan is separate from looking at the assimilative capacity of water bodies; however, the Integrated Plan analysis (and associated information from the Integrated Plan) could help with TMDL efforts in the future.

<u>Comments on the Basin Ranking and Criteria:</u>

- Bob Pitt asked whether the technical team had considered locations where there had been a lot of work done already.
  - SPU acknowledged that although most of the "low-hanging fruit" for CSO control had already been addressed, SPU did not consider prior project work in the ranking of basins and initial selection of projects.
- Jean Zodrow asked why certain salmon-bearing streams were rated as not applicable in the basin ranking results.
  - SPU clarified that the ranking focused on federally listed threatened and endangered species, which wouldn't capture the problems with pre-spawn mortality of coho salmon since coho salmon aren't a listed species in Seattle.
- Derek Booth noted that the fishable/swimmable criterion for the basin ranking is dependent on the other criteria, rather than a fully separate criterion.

<u>Comments on Stormwater Projects Being Considered and the Comparison to CSO Projects:</u>

- Kyle Dreyfuss-Wells expressed concern about how CSO and stormwater projects were being compared, and noted that it is important that stormwater projects are not asked to solve all issues associated with a watershed.
- Bob Pitt commented on the Consent Decree standard for showing that the stormwater projects are "significantly better" than the CSO projects that will be deferred.[1] He said most communities only need to show that the projects are equivalent or better. Moreover, SPU will also need to consider uncertainty.
- Kyle Dreyfuss-Wells asked about the relationship of the types of stormwater projects SPU is considering and green stormwater infrastructure.
  - SPU noted that green infrastructure (natural drainage solutions) is part of the city's code.
  - Eric Strecker of Geosyntec and Beth Schmoyer of SPU said that many of the solutions are not "green" in part because they occur in areas where there is contaminated sediment, and the Consent Decree has standards for meeting pollutant load removals such as PCBs.

[1] The consent decree language pertaining to this comment is as follows: "the City may submit…a work plan ("Integrated Plan") that proposes water quality improvement project(s) ("Proposed Project") to be implemented by the City, provided that the Proposed Project(s) will result in significant benefits to water quality beyond those that would be achieved by implementation of the approved CSO Controls Measures only."

Terminology and Definitions:

- Bob Pitt recommended that SPU be specific about its terminology and definitions.
  - Based on this comment, SPU and the Integrated Plan team have begun preparing a glossary to address this need.

Discussion of Representative Constituents of Concern for Evaluation and Proposed Metrics for Technical Comparison of Stormwater and CSO Projects

- Eric Strecker of Geosyntec provided an overview of the proposed representative constituents of concern (RCOCs) for evaluation, the data compiled on the RCOCs, the extent of stormwater characterization data and the gaps in that data, and potential metrics to use in comparing stormwater and CSO projects.
  - The stormwater characterization data is from three sites in Seattle with different land uses.
  - He noted that the technical team was continuing to analyze the data it had received. In some cases, the technical team had not yet determined how much data is above detection levels.
  - The technical team is still evaluating appropriate constituents to measure for certain RCOCs, including oil and grease, pesticides, and PBDEs.
  - The candidate metrics for evaluation presented in this session did not include the metrics for the exposure assessment.
- In response to a question, SPU clarified the relationship of SPU's and King County's stormwater and wastewater systems, noting that both agencies have CSOs within the city of Seattle, SPU has responsibility for the majority of stormwater pollution control (for all but two stormwater basins where SPU and King County have MOAs), and SPU's wastewater collection system feeds into King County's regional wastewater treatment system.
- SPU reported that Ecology has recently changed the NPDES Municipal Stormwater permit requirement for monitoring from end-of-pipe monitoring to a regional, Puget Sound-wide monitoring of receiving waters, including marine nearshore and second order streams. Municipalities across Puget Sound (NPDES Phase I and Phase II) pay in to the regional monitoring. The sites were selected randomly across Puget Sound, and this has meant that there is only one site in Seattle.
- Members of the technical team noted that metrics for evaluation could consider peak events, and benefits such as how stormwater projects could reduce peak load and reduce floods.

Expert Panel Comments and Responses

Monitoring:

- After learning about SPU's monitoring of receiving waters, Bob Pitt commented that it would have been better if SPU had conducted monitoring that could show a connection between water quality in the pipes and in the receiving waters.
  - Jonathan Frodge of SPU noted that the best data showing increased body burden of pollutants associated with stormwater are from the National Mussel Watch Contaminant Monitoring program.
- Bob Pitt recommended that SPU start pre-project monitoring soon, and said that verification monitoring was critical.

Comments on RCOCs:

- Bob Pitt cautioned against using five-day biological oxygen demand (BOD) to evaluate stormwater projects, as the analytical method can give distorted results. This is particularly a problem for measuring dissolved oxygen in sediments. The ultimate BOD (or also looking at the chemical oxygen demand, COD) is more accurate than the five-day measure.
    - Based on this comment, Geosyntec will further investigate how to characterize BOD when ultimate BOD was not measured but five-day BOD was included in the sampling events. There are a few alternatives to address this issue.

Comments on Candidates for Comparison Metrics:

- Bob Gearheart and Kyle Dreyfuss-Wells asked about the sediment issues that were being considered. Legacy sediments will be mobilized in different runoff events.
    - Eric Strecker said that the evaluation is considering both minimizing recontamination of remediated legacy sediment sites and reducing new sediment loads. The idea is that retrofitting an area will reduce or prevent mobilization of certain sediments.
- Kyle Dreyfuss-Wells noted that it is important for there to be a connection between the projects and the metrics that will be used to evaluate them. It was not clear that some of the projects would have the types of benefits listed. Many of the CSO projects would not have the benefits.
- Derek Booth commented that the "frequency of untreated discharges" metric did not seem appropriate for stormwater projects, and therefore it was not useful for comparing CSO and stormwater projects. He said the benefits from projects come from attributes other than frequency of discharges, and that it would be disingenuous to consider green stormwater infrastructure as "treatment."
    - Eric Strecker said that the technical team would work on that metric. He mentioned that one attribute they were considering was volume reduction.

Discussion of Pollutant Estimation Methodology for Stormwater and CSO Projects

- Rob Annear of Geosyntec gave a presentation on the proposed methodology for estimating pollutant loads from stormwater projects. His presentation covered:
    - Understanding baseline conditions and developing a pollutant load model to estimate average annual runoff volumes, pollutant loads, and pollutant concentrations
    - The stormwater structural projects and programmatic measures SPU is considering in the Integrated Plan evaluation
    - The process proposed for estimating and evaluating the expected performance of stormwater projects, factoring in conceptual design parameters, variability, and uncertainty
- He noted that the technical team proposes using pre-processed nomographs for evaluating hydrology and hydraulics (H&H) performance, where possible, rather than facility-specific models.
- Justin Twenter of Brown and Caldwell presented on the technical team's proposed methodology for estimating pollutant loads from CSO projects. His presentation covered:
    - The CSO projects SPU is considering to defer as part of the Integrated Plan
    - Information on the CSO basins from modeling conducted for the long-term control plan (LTCP)
    - Four potential approaches for evaluating deferred CSO projects: source area evaluation, land-use evaluation, CSO characterization, and/or a hybrid approach

- The 10 potential CSO projects to defer would reduce out of compliance volume by 10 million gallons per year on average.
  - SPU is doing an environmental impact statement, which will describe the potential impacts of the projects. In general, they will involve local disturbance during construction. For example, SPU needs to find seven storage tanks to control four million gallons of overflow in a waterfront area of Seattle. Green infrastructure projects also can be disruptive (e.g., to parking).
  - The 10 CSO projects represent about 20 percent of the projects in the long-term control plan.
- Trish Rhay of SPU noted that without the Integrated Plan, all the CSO projects would have to be built by 2025, for a cost of $500-$550 million. With the Integrated Plan, SPU can propose to defer some of those CSO projects, proposing other completion dates, and then implement stormwater projects between now and 2025 that could provide greater water quality benefits. SPU is assuming that these stormwater projects would be done without increasing the cost through 2025.
- SPU staff and the technical team noted that because of the requirements of the consent decree for the Integrated Plan, SPU would need to evaluate the CSO projects being considered for deferral according to additional water quality parameters.
- There is not much public reaction to CSOs in Seattle, which mostly occur in the winter. SPU and King County have a website that shows where CSO outfalls are and when they are overflowing.
- Overflows are evaluated on a 20-year rolling average, so if there are 21 overflows at one site in 20 years the CSO is in violation of the one overflow per outfall per year standard. Seattle's NPDES permit is on a five-year window.

Expert Panel Comments and Responses

Selection of Projects for Consideration:

- Derek Booth commented on the projects that SPU had selected for consideration for the Integrated Plan, and asked for more information about the process SPU used to get to the initial list. He thought the Expert Panel could have provided input on that phase of the evaluation.
  - Kevin Buckley of SPU explained that SPU's process for identifying stormwater projects included prioritizing the basins and looking at the goals for the water bodies, evaluating technologies and green infrastructure options for meeting the goals, estimating the cost per weight of total suspended solids (TSS) removed for the potential solutions, and reviewing the options with management. He noted that SPU selected a list of stormwater projects for the Integrated Plan evaluation that went far beyond the number needed for the Integrated Plan, in order to ensure that there would be a healthy menu of options to evaluate, while not being an overly exhaustive list that would be too time consuming to optimize.
- Kyle Dreyfuss-Wells and Bob Pitt asked about whether the projects were limited to those that were under SPU's control or whether they could include projects with private landowners. In Kansas City, the efforts with private land were done simultaneously to those on public land.
  - Kevin Buckley and Tracy Tackett of SPU said that there were some constraints on the projects selected, since SPU needed to have assurance that the projects will be completed for the Consent Decree. One of the stormwater alternatives focuses on retrofitting neighborhood blocks for natural drainage; this focuses on the right-of-way, but it could be expanded to include the RainWise program, which affects private property.

- Bob Pitt asked about the street sweeping projects planned, and noted that the current street sweeping efforts could be evaluated for their effects on receiving water quality.
  - Shelly Basketfield of SPU described Seattle's street sweeping program, and that the projects being considered for the Integrated Plan would increase both the frequency of sweeping and the coverage. SPU is evaluating whether street sweeping is cost-effective in areas that do not have curbs.
  - Beth Schmoyer of SPU noted that SPU did a mass balance analysis for the street sweeping pilot in 2007-08, but acknowledged the utility does not have stormwater monitoring data.
- Kyle Dreyfuss-Wells asked why green stormwater infrastructure (GSI) / natural drainage solutions were considered part of the CSO projects, not the stormwater projects.
  - SPU staff said that the GSI projects are viewed differently depending on where they are in the system. Within the CSO area, GSI projects can reduce the volume of CSO overflows or the size of CSO storage facilities.
- Kyle Dreyfuss-Wells also asked whether the City's stormwater monitoring basins contain any stormwater treatment BMPs that could reduce pollutant concentrations in the samples.
  - Kevin Buckley of SPU replied that the monitored basins have minimal BMPs.
- Bob Pitt suggested that it would be important to know where the potential deferred CSO projects are, and how that relates to where benefits might be gained through stormwater projects. Derek Booth expressed doubt about whether regulators would see a pound of pollutant reduced in Pipers Creek as equivalent to a pound of pollutant reduced in Lake Washington, even though the Consent Decree is not explicit on this issue.
- Bob Pitt, Bob Gearheart, and Derek Booth commented on the high proportions of groundwater shown in the delineation of flow source areas for CSO basins.
  - Ed Mirabella of SPU noted that the "groundwater" included inflow and infiltration (I&I), and the numbers were from CSO events.
  - Bob Pitt said that the numbers imply that SPU needs to do more than just address surface water, including I&I reduction efforts. He also asked whether there was any way to validate the constituents in the groundwater.
  - Derek Booth recommended comparing the modeled groundwater flows for the CSO basins to the groundwater table.

<u>Comments on Proposed Process for Evaluating Projects:</u>

- Bob Pitt noted that a potential problem with nomographs is that they assume a certain device. It is therefore important to include a step to verify that the device fits within the range of data.
  - SPU and the technical team agree with the comment. Nomographs can be very general or made more site- and device-specific. The team will make sure that either the nomographs are specific to the performance range for a site or will be verified afterwards if a more general nomograph has been used.
- Bob Pitt said that SPU has an opportunity to reduce uncertainty by incorporating water quality monitoring into projects so that SPU can evaluate whether the projects achieve their expected benefits. He also observed that SPU doesn't have baseline data for the projects.

- Kevin Buckley said that SPU would be doing post-construction monitoring of the stormwater projects, as it does with CSO projects. However, he acknowledged that this monitoring is tied to the projects, not to the receiving water bodies.
- Bob Pitt suggested considering small-scale intensive demonstration projects that are monitored intensively, such as a drainage area of a watershed that is intensively retrofitted as compared to an area that is not retrofitted. Once you have confidence in the drainage area, then you may understand more about the receiving water body.

- Bob Gearheart asked whether it might be possible to focus projects in one watershed so that success could be more easily demonstrated, rather than dispersing the projects.
- Reacting to the example metric for the project evaluation, Derek Booth expressed concern that the comparison of projects could overlook ancillary benefits from projects by focusing on metrics that can be easily compared in spreadsheets. Jean Zodrow added that it would be important to tie all the benefits together and not just focus on pollutant loads.
  - Rob Annear mentioned that SPU and the technical team welcome suggestions for other ways to compare projects, such as effects on habitat.
- Bob Pitt noted that cost (capital cost, land cost, opportunity cost) is another factor that will need to be built into the decision analysis.
- Kyle Dreyfuss-Wells observed that "gray" infrastructure projects could have much greater impacts during construction compared to "green" infrastructure projects. Bob Pitt added that green infrastructure projects are also disruptive, but the disruption is often smaller and for a shorter time.
  - Ed Mirabella of SPU and Jennifer Price of CH2M HILL noted that community reactions to disruption from green and gray CSO/stormwater projects has varied in Seattle, and some neighborhoods have had more issues with green infrastructure projects than CSO storage tanks.

Receiving Water Exposure Assessment Methodology Discussion

- Rick Pleus of Intertox gave a presentation on the proposed exposure assessment for the Integrated Plan, which would look qualitatively at the hazard (toxicity) and the exposure for both human and ecological receptors.
  - This methodology can be used to compare projects, as well as to compare "before" and "after" conditions associated with projects, for the RCOCs discussed earlier.
  - While the initial approach to the Exposure Assessment methodology has been developed, SPU and the technical team will refine the methodology for the Exposure Assessment after SPU reviews the quality and quantity of the data relevant to the assessment. The key parameter at this point is the concentration of a relevant RCOC.

Expert Panel Comments and Responses

Comments on RCOCs and Data Gaps:

- Jean Zodrow observed that it seemed as though SPU did not have good data for some constituents, such as pesticides, and asked what the technical team would do in the absence of anything other than TSS to measure those constituents. Semi-volatile organic compounds (SVOCs) are another area where there may not be much data.

- Rick Pleus of Intertox clarified that the issue with pesticides was not that SPU did not have data for pesticides, but that the technical team had not identified which pesticide it would evaluate and what data are available to consider. The technical team is currently evaluating the data available. For example, it appears that two weaknesses in data quality and quantity may be PBDEs and oil/grease. He also asked whether choosing certain surrogates, such as copper for metals, would cause the team to miss anything important.
- Jean Zodrow suggested that PCBs could be a surrogate for PBDE, as those constituents may have similar behavior. For SVOCs, TSS could potentially be used. It is important to pick the right constituents to measure, since they get carried through. Rick Pleus said he understands the possible use of surrogates in the Exposure Assessment but would need to consider the data sets and constituents better to provide an opinion whether either of these is reliable.

- Bob Pitt noted that some constituents, such as copper, could be present in many types of form (complex, ionic, coil, associated with sediment, etc.). The different forms of the constituent will behave differently, and that could affect toxicity and exposures.
  - Bob Pitt asked whether SPU would use water chemistry modeling to evaluate the behavior of different speciation of constituents. Rob Annear of Geosyntec said that the technical team would be relying on receiving water and stormwater sampling data.

<u>Comments on Variations in Exposure:</u>

- In regards to Rick Pleus' question of the Expert Panel on whether acute exposures should be considered, Bob Pitt noted that acute (short exposure) issues are rare for receiving waters; chronic issues, especially associated with sediment, are much more common. Chronic exposure to fecal coliform can lead to regrowth in streams, for example.
- Jean Zodrow said that there are acute issues associated with the first stormwater event. For example, there is the potential for fish to be exposed to dissolved copper, which is what the National Marine Fisheries Service focuses on.
  - Bob Pitt observed that it would be important not to oversimplify the answer, given the complexity of the exposures.
  - Mike Milne of Brown and Caldwell added that the key is not to introduce any bias when comparing projects.
- Kyle Dreyfuss-Wells observed that it would be useful to know what happens to the first flush of stormwater for evaluating effects on exposures. She added that it is important to consider how projects affect exposure in the context of how the overall system is operating.
  - Eric Strecker noted that sediments are often more suspended in CSO areas.
  - Bob Pitt said that volume reduction and maximizing the flows that go to the treatment plant are important strategies.
- Bob Gearheart asked how the technical team would evaluate temporal effects.
  - Rick Pleus of Intertox said that the technical team would review on a case-by-case basis whether it would be useful to get more detail for a given parameter for the Exposure Assessment (e.g., season, duration, etc.).

Bringing It All Together: Reflections on the Proposed Methods and Data Sources

- At this point in the meeting, the Expert Panel was asked for overall impressions and reflections on the proposed methodology and the data that SPU plans to use for the evaluation. Reflections included the following:
  - Bob Gearheart said that the momentum of the project seems to be on the right track.
  - Jean Zodrow said she believed that things were on the right track, except for minor details.
  - Derek Booth commented on the difference between the complexity of understanding the behavior of constituents and their effects on exposure on the one hand and the simplicity of the exposure assessment tools being proposed to evaluate them on the other hand. He did not have suggestions for the exposure assessment methodology, but expressed doubts that it would be adequate.
    - Eric Strecker noted that SPU only needs to compare projects, as opposed to show what the exposure is.
  - Bob Pitt commented that he was astonished by the rapid time frame in which this is being done, and the limited time for evaluation. He noted that it is critical that SPU will be able to verify its efforts, and suggested reserving a fraction of the money for projects for verification.
    - Mike Milne of Brown and Caldwell said that there may be ways to address uncertainties based on how projects are combined into alternatives and selected.
  - Kyle Dreyfuss-Wells said that overall this is a good idea, and that the "perfect can be the enemy of the good." She expressed concern that stormwater projects are not getting adequate consideration as compared to CSO projects.
    - Bob Pitt added that we should not need a different standard for comparison.

Overview of the Multi-Objective Decision Analysis (MODA) Process

- Emiko Takahashi of SPU presented on SPU's use of MODA, covering:
  - When and why SPU uses MODA
  - A car example showing different elements of MODA process—the criteria, measurement scale, and weighting of social and environmental criteria, and then comparing those benefits or values to the costs of the options
  - An example of MODA applied to stormwater projects from Bob Pitt's paper, with the key difference in SPU's analysis that costs were analyzed separately from other criteria
  - Categories of draft MODA criteria SPU is considering for the Integrated Plan
- She noted that MODA will be used to evaluate CSO and stormwater projects individually, and then to compare CSO and stormwater projects. The MODA doesn't make the decisions, but helps inform the decisions.
- In June, SPU will present draft technical criteria for the MODA evaluation for the Expert Panel to review and comment on.

Expert Panel Comments and Responses

- Derek Booth asked how SPU would use MODA to choose projects when there is a hard decisions—that is, there are no obvious choices (high value/low cost) that emerge.

  - Emiko Takahashi said that one way to help with those situations is to reconsider the weights for the criteria.
  - Bob Pitt said that external constraints, such as budget, also influence the decision.
- Bob Gearheart said that the transparency of the weighting is critical. He also asked how the weighting would be done.
  - Emiko Takahashi replied that SPU would have a diverse staff group do the weighting, and then would conduct sensitivity analyses of the results.
- Bob Pitt suggested incorporating dollars per pound into the analysis, rather than evaluating cost separately.
- Derek Booth said that an important weighting is the "fatal flaw weighting"—how SPU decided which projects would be considered for the Integrated Plan. The Expert Panel needs to know what criteria were used to determine whether projects were fatal flaws. People have different opinions of what makes something a fatal flaw.
  - Emiko Takahashi said that one fatal flaw criterion was whether SPU could fund the project.
- Derek Booth and Kyle Dreyfuss-Wells discussed the potential criterion for leveraged funding. Derek Booth noted that leveraged funding could be double counted since cost is considered elsewhere in the MODA; instead of including it as a social/environmental value, the cost with leveraged funding could be plotted as another point on the cost chart. Kyle Dreyfuss-Wells said that this criterion should not be overlooked, but agreed it could be handled that way.
- Several Expert Panel members commented that may have advice relevant to the non-environmental criteria for the MODA and could offer comments, even though they may not be "experts" on those topics.

Observer Comments

- Rachel McCrea of the Washington State Department of Ecology said that some of the comments expressed at the meeting resonated with her, but she had no further comments at this time.
- Jennifer Price of CH2M HILL noted that she was attending the meeting as an observer for the City of Spokane, which is evaluating similar issues, but not within the context of a consent decree. She is interested in identifying a methodology that could be replicated that is not too cost prohibitive or complicated.

Wrap Up and Next Steps

- Trish Rhay of SPU thanked Expert Panel members for their participation, and said that SPU's challenge is to have solid enough data to tell a reasonable story and have enough time to get the analysis done.
- Bob Gearheart acknowledged his appreciation for the staff work supporting the Integrated Plan thus far, and noted that engineers need to make decisions with less data than this all of the time.
- Bill Ross of Ross Strategic added that SPU will need to make a reasoned judgment comparing stormwater and CSO projects based on available data, without understanding everything that may be occurring in the landscape and water bodies.
- Next steps identified at the meeting included:

- The **next Expert Panel meeting** will be on **Tuesday, June 25, 2013,** in Seattle. It will focus on the technical criteria for the MODA evaluation.
- Kevin Buckley of SPU said that he will brief SPU management on this meeting, and will meet with the technical team to discuss how to respond to the Expert Panel's suggestions. Information on the technical team's proposed responses will be distributed to the panel.

Participants and Observers

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Expert Panel Members	
Bob Gearheart, Chair	Professor Emeritus, Humboldt State University, Arcata, CA
Derek Booth	Adjunct Professor, Bren School of Environmental Science and Management, University of California Santa Barbara, Santa Barbara, CA
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Nancy Ahern	SPU
Maythia Airhart	SPU
Martin Baker	SPU
Shelly Basketfield	SPU
Andy Chittick	SPU
Rex Davis	SPU
Pam Emerson	SPU
Jonathan Frodge	SPU
Ed Mirabella	SPU
Charles Oppelt	SPU
Beth Schmoyer	SPU
Tracy Tackett	SPU
Emiko Takahashi	SPU
Ingrid Wertz	SPU

Name	Organization
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Molly Adolfson	ESA
Rob Annear	Geosyntec Consultants
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Rick Pleus	Intertox
Jennifer Tice	Ross Strategic
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